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Forest tree seed certification in Canada under the OECD scheme and ISTA rules: 1981-1985 summary report

D.G.W. Edwards

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Pacific Forestry Centre
Victoria, British Columbia

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Abstract

In the period 1981-1985, the Canadian Forestry Service issued 665 certificates of provenance in accordance with the OECD scheme for the control of forest reproductive material moving in international trade. These represented 165 "source-identified" seedlots and three seedlots in the "untested seed orchards" category, for a total weight of 8222 kg valued at over $5 million. This brought the total of certificates issued since the inception of the scheme in Canada to 2305 for 595 seedlots weighing 24 137 kg.

Between 1983 and 1985 (1981 and 1982 activities were reported previously), 302 international certificates of seed quality were issued in accordance with the ISTA rules for 9833 kg of seeds. These brought the total seed quality certificates since 1979 to 651, and the total weight of seeds for which tests were performed to 29 596 kg.

Résumé

De 1981 à 1985, le Service canadien des forêts a délivré 665 certificats de provenance conformément au système de réglementation du commerce international du matériel forestier de reproduction. Ces certificats représentaient 165 lots de semences «identifiés à la source» et trois lots de semences provenant de «vergers à graines non contrôlés», pour un poids total de 8 222 kg et une valeur de plus de 5 millions de dollars. Un total de 2 305 certificats ont été délivrés depuis la mise en application de ce système au Canada, regroupant 595 lots de semences pesant 24 137 kg.

De 1983 à 1985 (nous avons fait état des activités de 1981 et de 1982 dans un rapport antérieur), 302 certificats de qualité des graines reconnus à l'échelle internationale ont été délivrés conformément aux règles de l'AIES pour 9 833 kg de graines. Le nombre total de certificats de qualité des graines délivrés depuis 1979 est maintenant de 651 et le poids total des graines pour lesquelles des essais ont été effectués est de 29 596 kg.

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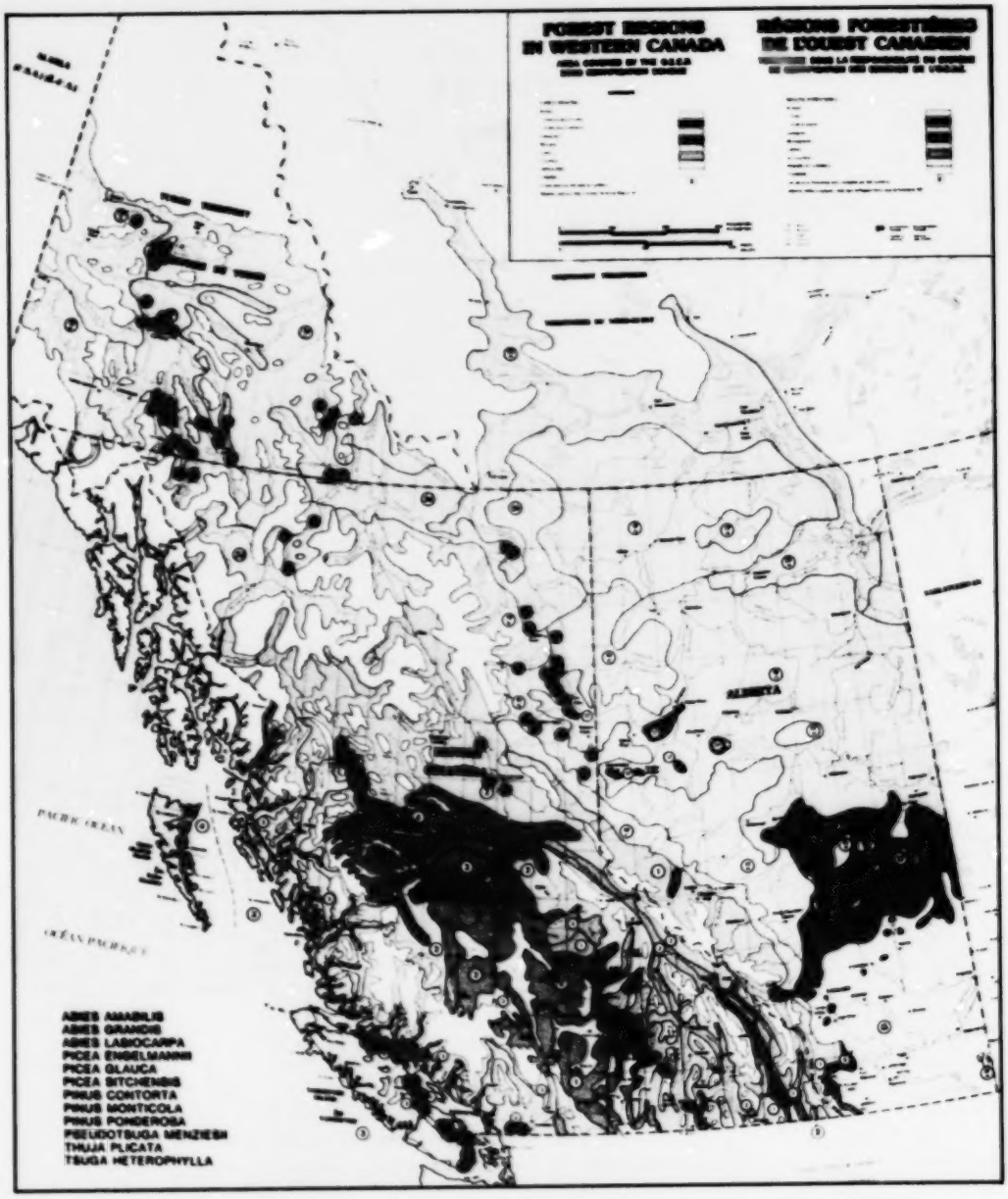
Mention in this publication of specific firms, services, or products does not constitute endorsement of such by the Canadian Forestry Service.



Collection sites in British Columbia and the Yukon which have produced certified seedlots.

Introduction

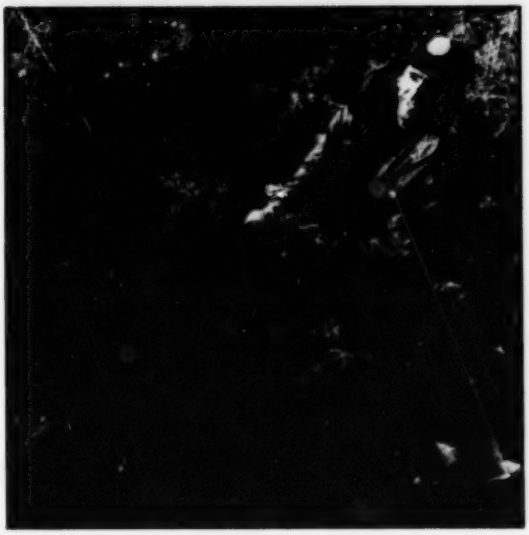
Certification of origin of Canadian forest tree seeds began in 1970 under a scheme established by the Council of the Organization for Economic Cooperation and Development (OECD). This scheme, recognized and applied by several European and North American countries, was developed to control forest reproductive materials moving in international trade. Responsibility for implementation of the scheme in Canada was delegated to the Canadian Forestry Service, the regional forestry centres of which were assigned the task of administering seed certification. Almost all seed certification has occurred in British Columbia and the Yukon and, as a result, the Pacific Forestry Centre has become the centre of coordination for the Canadian OECD program. Details of the scheme were described by Piesch and Stevenson (1976) and synopses of activities from 1970 to 1980 were published by Piesch (1977) and Pollard (1982a).

Certification of quality of Canadian tree seeds under the International Seed Testing Association's (ISTA) rules began in 1974 at the Petawawa National Forestry Institute, Chalk River, Ontario. Official seed testing was transferred in 1978 to the Pacific Forestry Centre since all of the material requiring international certificates of seed quality originated in the Pacific region and had generally undergone seed origin certification under the OECD scheme. A background to ISTA, and to the accreditation of the Pacific Forestry Centre as an official member laboratory, was described by Edwards (1983), together with a synopsis of activities between 1979 and 1982.

Both OECD and ISTA certification are voluntary and are applied only according to the requirements of seed purchasers. However, at least 90% of all the tree seeds collected for export from Canada are certified.

Summary of activities prior to this reporting period

The first year (1970) of operation of the OECD scheme saw the greatest weight of seeds certified as to their origin (Table 1). Certification decreased dramatically through 1975, then increased spectacularly in 1976. Between 1978 and 1980 approximately 2000 kg of seeds were certified for export annually. The seeds of twelve species were involved; Sitka spruce (*Picea sitchensis* [Bong.] Carr.) and Douglas-fir (*Pseudotsuga menziesii* [Mirb.] Franco) accounted for the bulk initially. A substantial demand for lodgepole pine (*Pinus contorta* Dougl.)[1] seeds developed in 1971 and this species has contributed significantly to the certification volume since then. The total export value of seeds certified was estimated at more than $3.25 million for the first decade of operations.



Lodgepole pine cones picked from felled trees.

Quantities of seeds certified do not necessarily reflect demands for these species (Piesch 1977), since collections are strongly dependent upon available cone crops. Lodgepole pine crops have been relatively steady, while those of other species, especially grand fir (*Abies grandis* (Dougl.) Lindl.), Sitka spruce and Douglas-fir have been erratic. The increased use of lodgepole pine for reforestation of northern and high-elevation sites in Sweden had accentuated the Yukon Territory as an important source of this species (Pollard 1982a).

Following establishment of the official seed quality testing program in 1979 at the Pacific Forestry Centre, 349 international certificates (270 blue certificates based on samples submitted by the

[1] Nomenclature as given in Hosie (1979).

Table 1. Forest tree seed certification under the OECD scheme in Canada, 1970-1980

Year[a]	Seedlots certified	Certificates issued	Species	Weight of seeds (kg)	Estimated value[b] on overseas market (Canadian $)
			British Columbia and Yukon Territory		
1970	44	225	9	3 506	113 000
1971	35	261	4	2 486	204 000
1972	26	135	5	976	126 000
1973	6	122	2	168	34 000
1974	8	87	4	131	11 000
1975	8	100	1	106	32 000
1976	20	172	5	1 830	394 000
1977	11	60	2	588	241 000
1978	58	158	5	2 080	685 000
1979	39	146	6	2 050	642 000
1980	40	168	8	1 984	785 000
Total	295	1634	12	15 905	3 267 000
			Alberta and Northwest Territories		
1979	2	2	2	5	–[c]
1980	3	4	3	5	–[c]
Total	5	6	4	10	–
Grand Total	300	1640	15	15 915	>3 267 000

[a] Fiscal year of certification; for example, 1976 corresponds to April 1, 1976 to March 31, 1977.

[b] Estimated average values per kilogram of seeds:

Species other than lodgepole pine:	1976-1978, $200
	1979-1980, $250
Lodgepole pine, B.C. sources:	1976-1980, $400
Lodgepole pine, Yukon sources:	1976-1977, $500
	1978-1979, $550
	1980, $600

[c] No commercial values available.

dealers and 79 orange certificates based on representative samples collected by staff of the Pacific Forestry Centre) had been issued by 1982; more than one-third of these were issued in 1981 (Edwards 1983). ISTA certification included a much broader range of species than the OECD program (27 conifer and one broadleaf) since some of the seed merchants were brokering seeds from and to other parts of the world and these were submitted for official purity and germination tests along with native species. Many of the seedlots certified in the OECD scheme were subdivided prior to sale and each component seedlot was individually tested and certificated; this also added to the number of tests performed.

Lodgepole pine seeds played a prominent role in the ISTA program, accounting for more than

one-half (189) of the seed quality certificates issued. Highest quality seeds of preferred sources of lodgepole pine may command well over $1000/kg and, on this basis, it was estimated that the export trade value of all seeds tested between 1979 and 1982 exceeded $2 million.

Seed source certification, 1981-1985

The number of certification requests in 1981 and 1982 was markedly lower than in the previous 3 years; this was most likely a reflection of the global economic downturn. Requests increased dramatically in 1983 following a region-wide heavy cone crop (Tables 2 and 3). In 1983, the second highest weight of seeds since operations began in Canada, nearly 2600 kg, was certified. Almost 50% of this was Sitka spruce, the result of a heavy crop in the Queen Charlotte Islands. In direct contrast, a generally poor crop in 1984 eliminated collections in all species except lodgepole pine. A large crop of grand fir in 1985 resulted in a total of approximately 2200 kg of seeds being certified that year.

Between 1981 and 1985, lodgepole pine crops remained relatively consistent, averaging 686 kg per annum. Despite the absence of collectable crops in 1984 from other species, 927 kg of lodgepole pine seeds were certified that year. The continued emergence of the Yukon Territory as an important source of seeds of this species for reforestation programs on high-elevation sites in

Aerial cone rakes used to collect grand fir cones.

Table 2. Forest tree seed certication under the OECD scheme in the British Columbia and the Yukon, 1981-1985

Year	Seedlots certified	Certificates issued	Species	Weight of seeds (kg)	Estimated value[a] on overseas market (Canadian $)
1981	27	112	2	1261	714 000
1982	46	138	5	1275	788 000
1983	33	161	6	2575	1 443 000
1984	29	85	1	927	678 000
1985[b]	30	169	4	2184	1 416 000
Total	165	665	7	8222	5 039 000

[a] Estimated average values per kilogram of seeds:

British Columbia:	1981-1983, $500
	1984-1985, $600
Yukon Territory:	1981-1985, $800

[b] Includes untested seed orchard seeds.

Table 3. Weight (kg) of seeds certified by species under the OECD scheme in British Columbia and the Yukon Territory, 1981-1985

Species[a]	1981	1982	1983	1984	1985
British Columbia					
Abies grandis		157	465		945
Picea glauca			59		
Picea sitchensis	751		1160		
Pinus contorta	231	222	34	319	199
Pseudotsuga menziesii		277	283		286
					128[b]
Thuja plicata		117	55		101
Yukon Territory					
Abies lasiocarpa		6			
Pinus contorta	279	496	519	608	525
Total	1261	1275	2575	927	2184

Grand Total = 8222 kg

[a] Nomenclature as in Hosie, 1979
[b] Seed orchard seeds

northern Sweden was substantiated. Between 1982 and 1985, the yearly quantities of lodgepole pine seeds certified from Yukon sources were at least double those from British Columbia sources. Yukon seed collection areas are smaller and less accessible than those in British Columbia, which is the primary reason for the increased use of more seedlots of smaller size (Pollard 1980) and the continued rise in the value of these sources (Table 2). The total value of all seeds certified from 1981 to 1985 was estimated to be in excess of $5 million.

Certification of seed quality, 1983-1985

The official seed testing program through 1982 has already been summarized. To synchronize the reporting of OECD and ISTA operations, only seed testing between 1983 and 1985 are reported here.

Between 1983 and 1985, a total of 302 international certificates were issued for more than 9800 kg of seeds (Table 4). Of these, 183 certificates, representing almost 5700 kg, were written in 1983 following the region-wide heavy cone crop. Thus, 1983 became the busiest year so far for official seed testing. The range of species remained high (as between 1979-1982) at 24, and included two broadleaf trees; this variety in species tested provided invaluable experience for laboratory analytical staff. Lodgepole pine seeds again dominated the species list, accounting for 161 certificates and the highest values per kilogram, especially from Yukon sources. In terms of numbers of certificates and amounts of seeds represented, Douglas-fir was a distant second to lodgepole pine. The export value of all seeds tested between 1983 and 1985 was estimated to exceed $2.5 million.

The majority of the certificates issued were blue; only 42 orange certificates were written. For each

Table 4. Number and type of ISTA certificates issued, 1983-1985

Species[a]	1983		1984		1985	
	Blue[b]	Orange	Blue	Orange	Blue	Orange
Abies amabilis	2				1	
Abies grandis	4				4	
Abies lasiocarpa	3				1	
Alnus tenuifolia	1					
Betula papyrifera	1					
Larix decidua	1					
Picea abies	1					
Picea engelmannii	1				1	
Picea glauca	18		3		2	
Picea pungens	1					
Picea mariana	8				2	
Picea sitchensis	4				2	
Pinus banksiana	4				2	
Pinus contorta	63	17	28	17	18	8
Pinus elliottii	1					
Pinus keysiya	1					
Pinus monticola	2				3	
Pinus ponderosa	4				2	
Pinus resinosa	1					
Pinus sylvestris	2					
Pseudotsuga menziesii	35		1		22	
Sequoia gigantea	1					
Thuja plicata	5				2	
Tsuga heterophylla	2					
Total certificates	183		49		70	
Wt. of seeds represented (kg)	5698		1610		2524	
Total (kg)			9832			

Grand Total = 9832 kg

[a] Nomenclature as in Hosie, 1979.

[b] Blue applies to sample submitted by dealer; orange applies to entire seedlot since sampling was performed by PFC staff.

Seedlots are sampled for testing.

orange certificate, an additional sample was drawn for phytosanitary inspection. Such inspections are mandatory under the Plant Quarantine Act of Canada, and all seed shipments in and out of this country must be accompanied by the appropriate health clearance certificate.

Referee testing

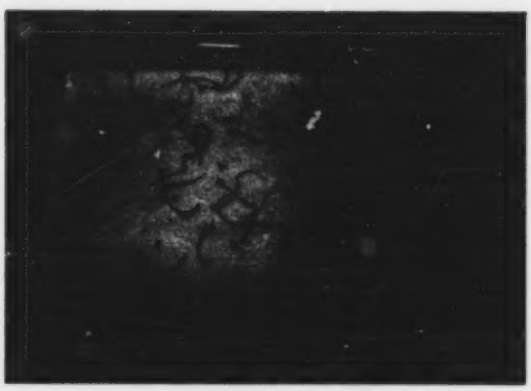
All ISTA member stations authorized to issue certificates of quality must participate in periodic tests that evaluate each station's test results for chosen seedlots. Stations whose results diverge from the norm must improve their methods if membership in ISTA is to continue. By means of such referee tests, ISTA ensures that each station adheres to international testing prescriptions and that analyses at each station are performed consistently.

The Pacific Forestry Centre and the Petawawa National Forestry Institute participated in two such tests, one in 1983 and another in 1985. One was a germination test of Douglas-fir seeds, and the other was a tetrazolium test of true fir seeds. As expected, both stations performed very well.

Expansion of seed certification

In 1985, seed origin certification was expanded to include seeds from three Douglas-fir seed or-

Testing seeds in a germination cabinet.



Germinated seeds are classified and recorded.

chards located on Vancouver Island (Edwards and Portlock 1986). They are the first Canadian orchards to satisfy basic OECD criteria such as isolation from contaminating pollen, an orchard design that maximizes outcrossing and minimizes inbreeding, and other requirements concerning the component trees and management practices. The orchards include seedling and clonally propagated parents and produce half-sib and full-sib

Seed orchard cone collections using hydraulic lifts.

seeds. In 1985, 128 kg of seeds from these orchards were certified.

Expansion of seed certification to include OECD categories other than "source-identified" had been anticipated by Pollard (1982b) who published a list of 129 Canadian seed orchards that had been established by the end of 1981. This list indicated the ownership, location, size, species and composition, year of establishment, and objectives of the orchards. However, except for the three orchards mentioned above, no other Canadian orchards have been registered under the OECD scheme.

In anticipation that certification would expand to other regions of Canada, a 3-day seed inspectors' workshop was held at the Pacific Forestry Centre during 1984. Since the Canadian Forestry Service is the designated authority for the OECD scheme in this country, employees from other regional forestry centres (Table 5) were appointed as seed inspectors and they were introduced to the certification processes established over the previous 15 years in British Columbia and the Yukon. The principal aim of this workshop was to promote a standardized certification methodology across the country. The *Forest Tree Seed Inspector's Manual*, revised for nation-wide application (Portlock 1988), was used as the main training vehicle.

Since 1979, when 10 kg of seeds were certified by the Northern Forestry Centre of the Canadian Forestry Service in Edmonton (Table 1), no provenance certification has occurred outside the Pacific Region.

Liaison

National

Certification requests have been regularly received from four of the western Canada merchants listed in the Appendix; the fifth company, producing seed orchard seeds, is expected to request certification with successive crops. Through correspondence and visits to merchants' facilities by seed staff on inspection and sampling assignments, informal liaison has been continuously maintained. No formal meetings were convened.

International

The certifying officer in the Pacific Region attended the meetings of the OECD in Paris in

Table 5. Canadian OECD seed certifying authorities

Geographic area	Certifying authority	Officer in charge
British Columbia and the Yukon Territory	Pacific Forestry Centre 506 West Burnside Road Victoria, BC V8Z 1M5	D.G. Edwards
Alberta and the Northwest Territories	Northern Forestry Centre 5320-122nd Street Edmonton, AB T6H 3S5	I.K. Edwards
Ontario	Great Lakes Forestry Centre P.O. Box 490 1219 Queen St. East Sault Ste.Marie, ON P6A 5M7	V.F. Haavisto
Quebec	Centre de Foresteré Des Laurentidese P.O. Box 3800 1055 Rue du P.E.P.S. Ste. Foy, PQ G1V 4C7	A. Corriveau
New Brunswick	Maritimes Forestry Service P.O. Box 4000 Fredericton, NB E3B 5P7	R.F. Smith
Newfoundland and Nova Scotia	Newfoundland Forestry Centre P.O. Box 6028 Building 304, Pleasantville St. Johns, NF A1C 5X8	Attention: R.F. Nostrand Program Director

1982 and 1985. Dr. D.G. Edwards of the Pacific Forestry Centre was appointed the Canadian OECD Officer in 1984 and, as a member of the Forest Tree and Shrub Seed Committee, attended the 19th Congress of the International Seed Testing Association in Ottawa in 1983.

Future of seed certification in Canada

Despite wide fluctuations in the amounts of seeds collected in different years, when viewed over each 5-year period the level of certification has been notably consistent. The markets for Canadian seeds have remained fairly static and the importation by certain countries, notably Sweden, may be reaching saturation levels since they are now in a position to use home-grown seeds of Canadian species. However, this may be offset as more seed orchards begin to produce exportable materials. If the seed merchants maintain or expand their markets, tree seed certification and testing in Canada will remain a necessity. The Canadian Forestry Service will continue to administer the OECD scheme and to apply the ISTA rules to seeds destined for export. New rules will be prepared to provide for the certification of other OECD categories, and amendments to the international seed testing rules will be adopted as they are published.

In 1980/81, the Canadian Forestry Service pre-

Certified seeds ready for shipment.

pared regulations for forest tree seeds to accompany the Seeds Act of Canada. Such domestic regulations, aimed at improving grading and labeling tree seeds moving within Canada, and also at controlling importation, were to have been aligned with those of OECD and ISTA (Pollard 1982a). Early in 1985, the Canadian federal government's policy was revised to minimize regulations affecting private and public enterprises, and support for implementation of the proposed forest tree seeds regulations was withdrawn. To fill this void, voluntary guidelines to control seed quality and seed transfer have been developed (Edwards et al. 1988) to safeguard the materials used in Canada's reforestation programs. Although more genetically improved seeds are becoming available, any genetic tree improvement could easily be nullified without a national seed certification program.

Acknowledgement

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Appendix

Canadian companies marketing forest tree seeds certified according to the OECD scheme and ISTA rules

CIP Inc., Tahsis Pacific Region,
Saanich Forestry Centre,
8067 East Saanich Road,
R.R. #1, Saanichton, BC, Canada
V0S 1M0.
Attention: Mr. V. Korelus
Phone: (604) 652-4023

Reid, Collins Nurseries Ltd.,
P.O. Box 430,
Aldergrove, BC, Canada,
V0X 1A0.
Attention: Mr. Lauchlan Glen
Phone: (604) 533-2212

Silva Enterprises Ltd.,
1296 Freeman St.,
Prince George, BC, Canada,
V2M 2R8.
Attention: Mr. Rolf Hellenius
Phone: (604) 563-3250

Western Tree Seeds Ltd.,
P.O. Box 144,
Blind Bay, BC, Canada,
V0E 1H0.
Attention: Mr. Frank Barnard
Phone: (604) 675-2463

Yellow Point Propagation,
Long Lake Road,
R.R. No. 3,
Ladysmith, BC, Canada,
V0R 2E0.
Attention: Mr. Don Pigott
Phone: (604) 245-4635

Need more information?

Requests for further information, for additional copies of this report, or for copies of detailed rules and regulations governing the operation of the OECD scheme and ISTA rules in Canada should be directed to:

Director General
Canadian Forestry Service
Pacific Forestry Centre
506 West Burnside Road
Victoria, British Columbia
V8Z 1M5

Phone: (604) 388-0600